0072650 = EP 0 725 650 A2

FLAG	ADDRESS	CONTROL	PROTOCOL	INFORMA-TION	FCS

FIG.1

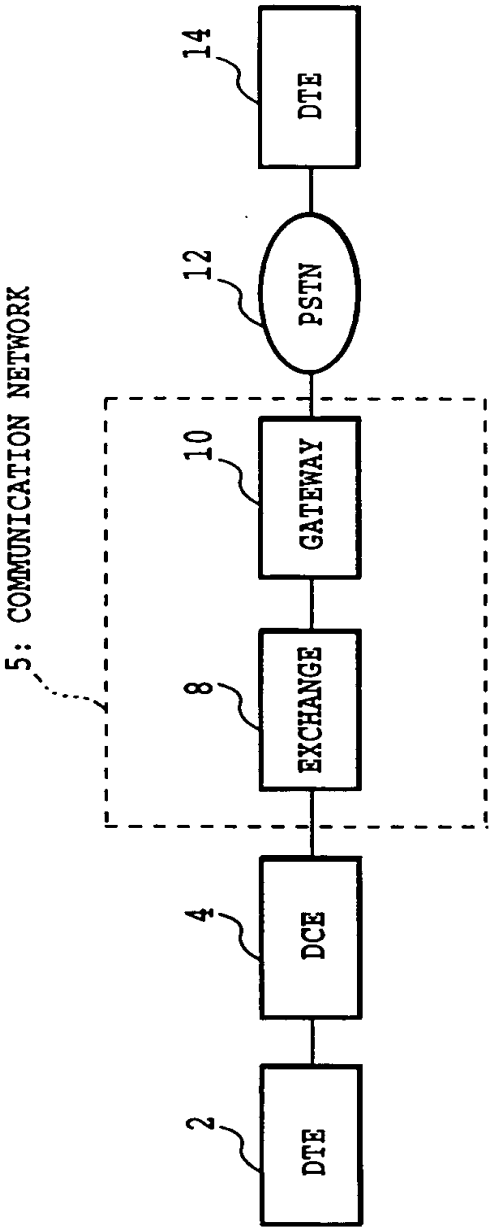
5: COMMUNICATION NETWORK
2
DTE
4
DCE
8
EXCHANGE
10
GATEWAY
12
PSTN
14
DTE

FIG.2

0074260 <EP 0 930 760 A2>

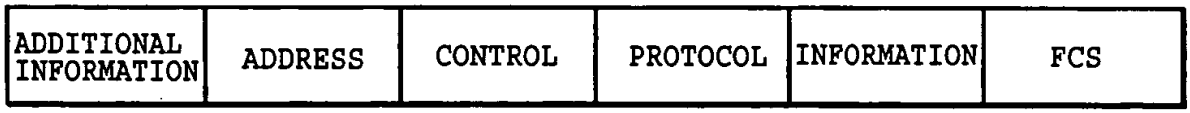

FIG.3

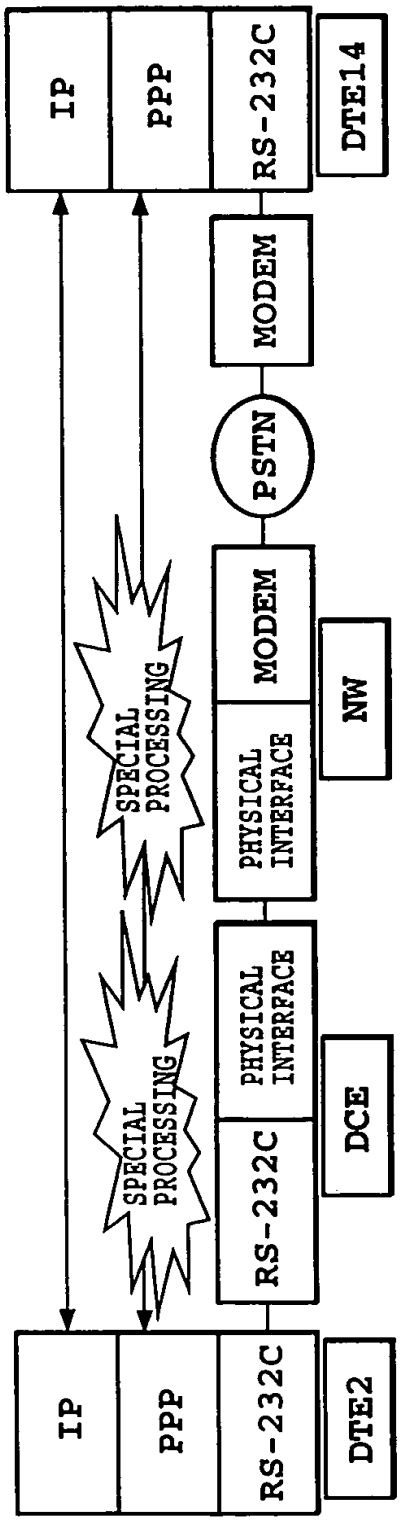
IP
PPP
RS-232C
DTE14
MODEM
PSTN
MODEM
NW
PHYSICAL INTERFACE
SPECIAL PROCESSING
SPECIAL PROCESSING
PHYSICAL INTERFACE
RS-232C
DCE
IP
PPP
RS-232C
DTE2

FIG.4

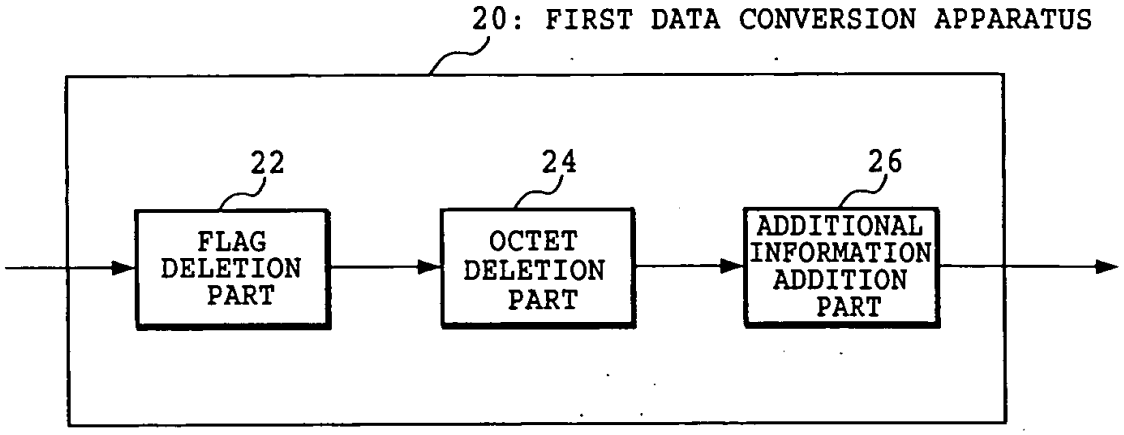
20: FIRST DATA CONVERSION APPARATUS
22
24
26
FLAG DELETION PART
OCTET DELETION PART
ADDITIONAL INFORMATION ADDITION PART

FIG.5

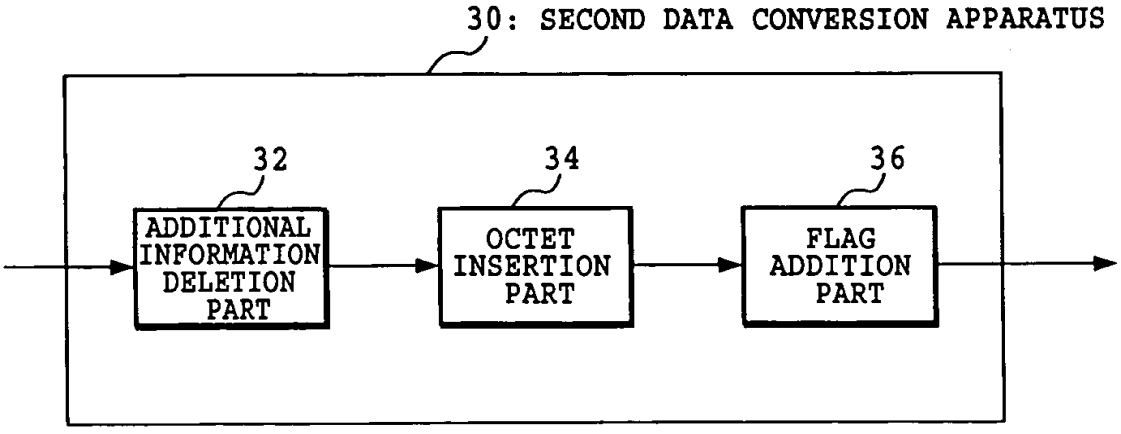
30: SECOND DATA CONVERSION APPARATUS
32
34
36
ADDITIONAL INFORMATION DELETION PART
OCTET INSERTION PART
FLAG ADDITION PART

FIG.6

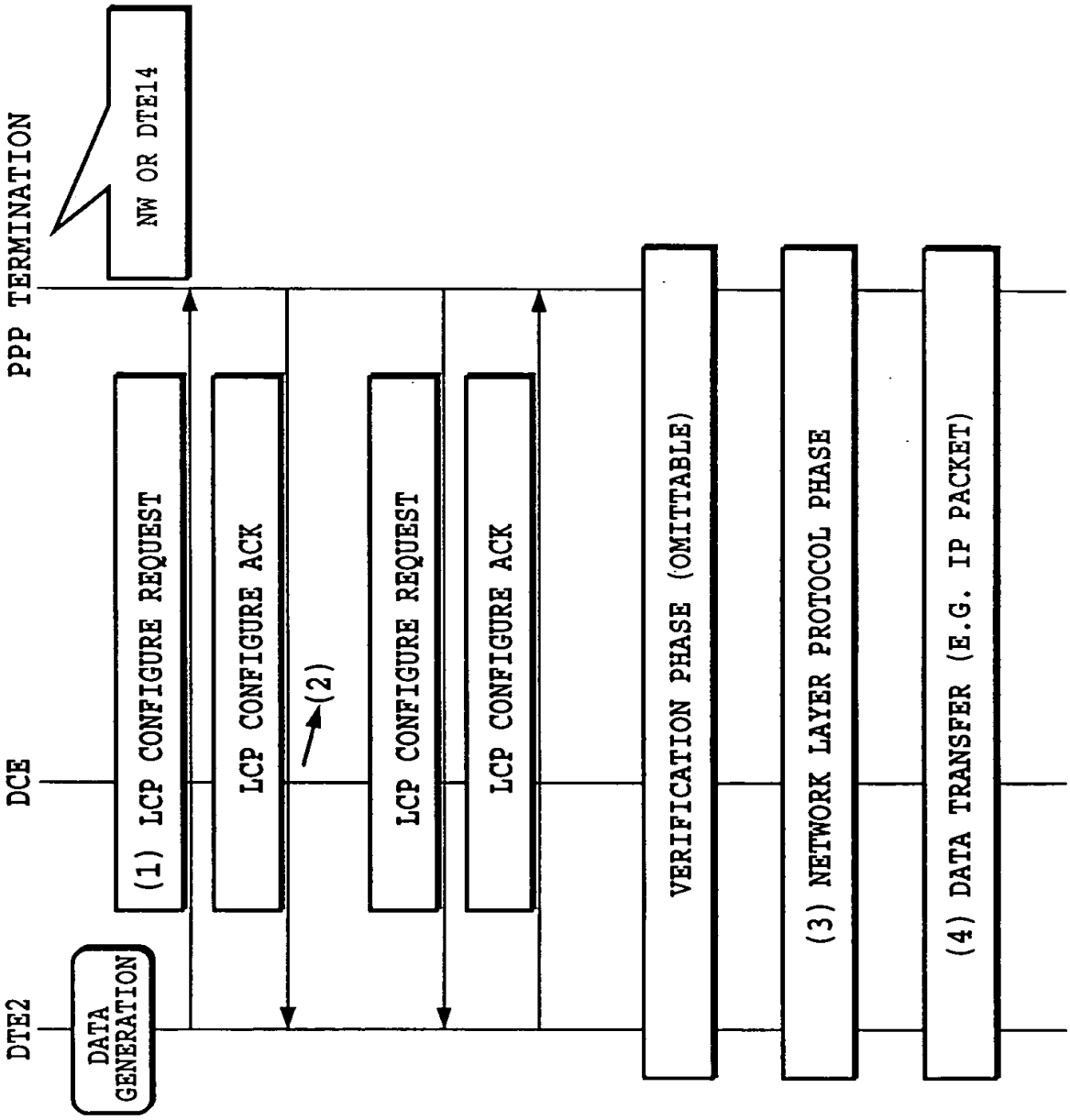
DTE2
DCE
PPP TERMINATION
DATA GENERATION
(1) LCP CONFIGURE REQUEST
LCP CONFIGURE ACK
(2)
LCP CONFIGURE REQUEST
LCP CONFIGURE ACK
VERIFICATION PHASE (OMITTABLE)
(3) NETWORK LAYER PROTOCOL PHASE
(4) DATA TRANSFER (E.G. IP PACKET)
NW OR DTE14

FIG.7

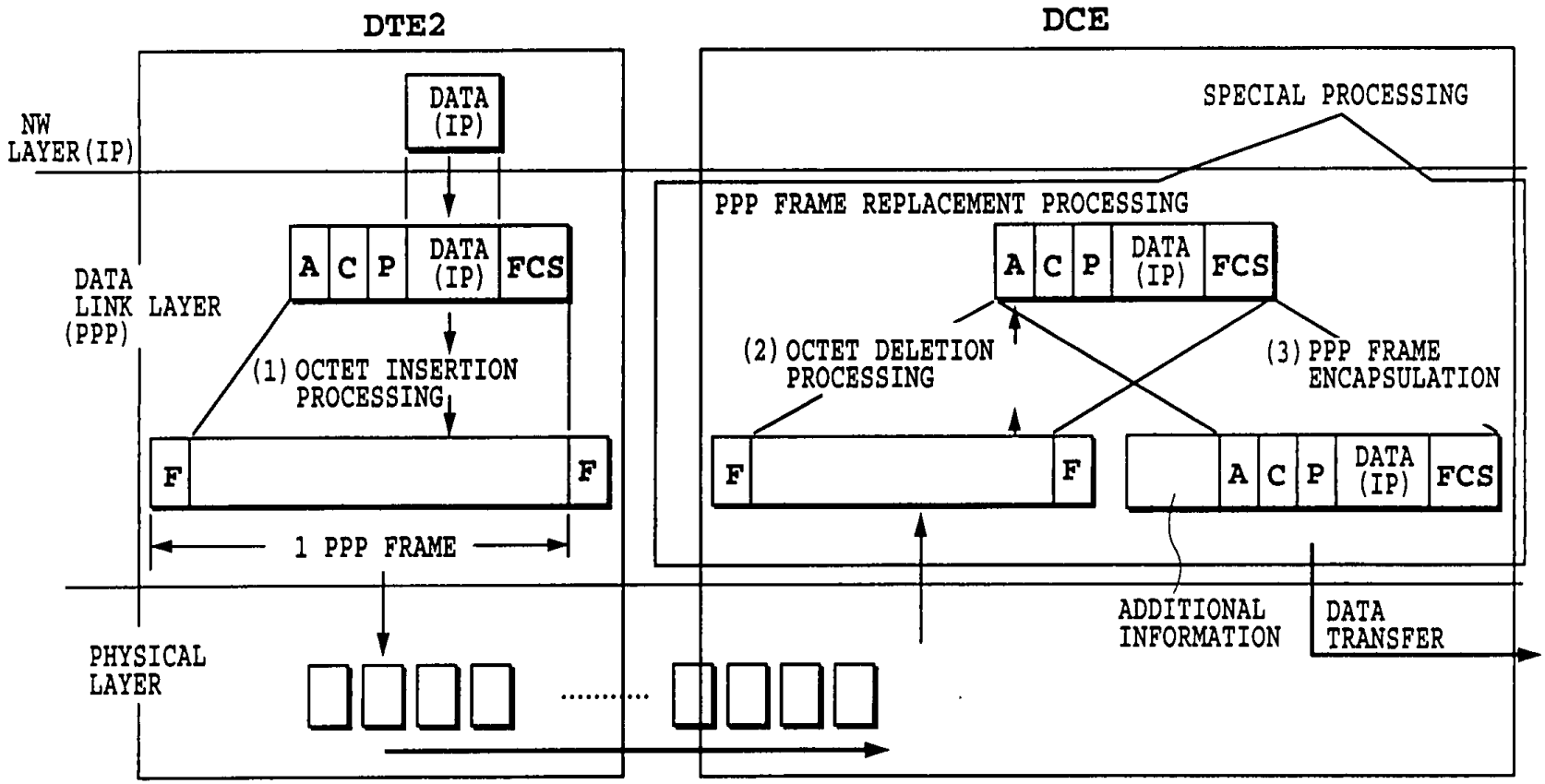
DTE2
DCE
NW LAYER (IP)
DATA (IP)
SPECIAL PROCESSING
PPP FRAME REPLACEMENT PROCESSING
A C P DATA (IP) FCS
DATA LINK LAYER (PPP)
(1) OCTET INSERTION PROCESSING
(2) OCTET DELETION PROCESSING
(3) PPP FRAME ENCAPSULATION
F
F
1 PPP FRAME
ADDITIONAL INFORMATION
DATA TRANSFER
PHYSICAL LAYER

FIG.8

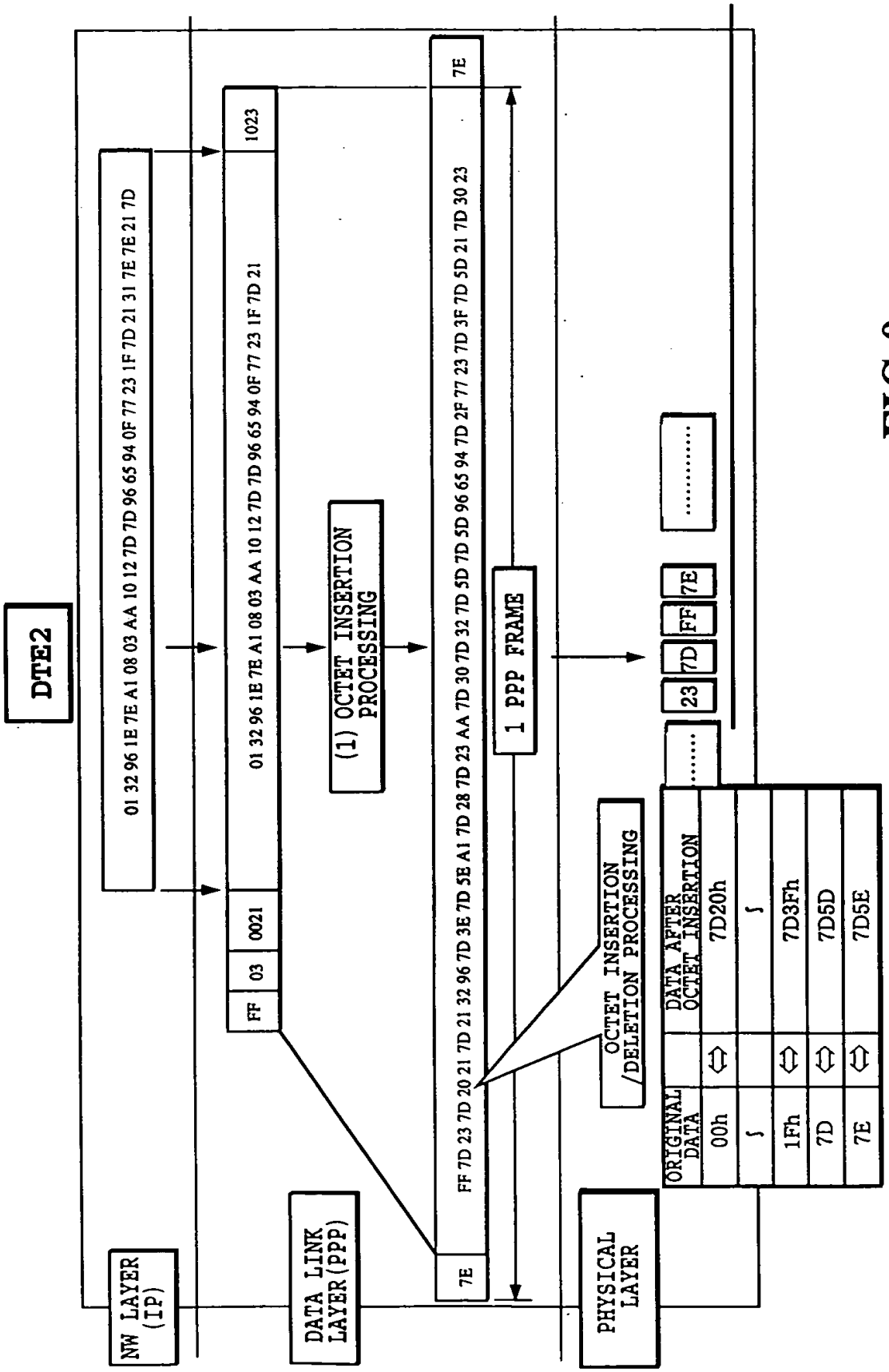
DTE2
NW LAYER (IP)
DATA LINK LAYER(PPP)
PHYSICAL LAYER
01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21 31 7E 7E 21 7D
FF 03 0021
01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21
1023
(1) OCTET INSERTION PROCESSING
7E
FF 7D 23 7D 20 21 7D 21 32 96 7D 3E 7D 5E A1 7D 28 7D 23 AA 7D 30 7D 32 7D 5D 7D 5D 96 65 94 7D 2F 77 23 7D 3F 7D 5D 21 7D 30 23
7E
1 PPP FRAME
OCTET INSERTION /DELETION PROCESSING
23 7D FF 7E
ORIGINAL DATA
DATA AFTER OCTET INSERTION
00h ⇔ 7D20h
1Fh ⇔ 7D3Fh
7D ⇔ 7D5D
7E ⇔ 7D5E

FIG.9

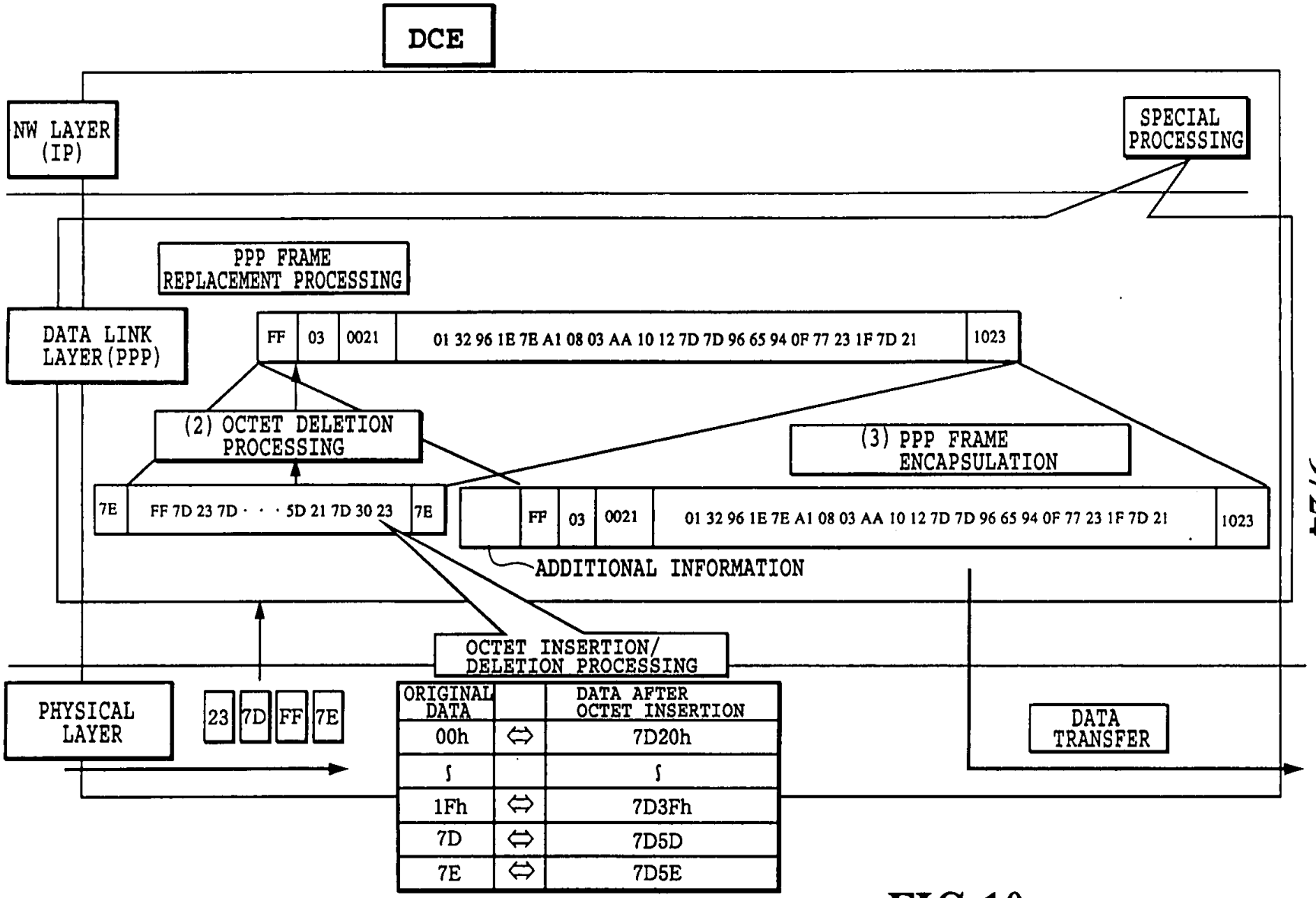
DCE
NW LAYER (IP)
SPECIAL PROCESSING
PPP FRAME REPLACEMENT PROCESSING
DATA LINK LAYER(PPP)
FF
03
0021
01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21
1023
(2) OCTET DELETION PROCESSING
(3) PPP FRAME ENCAPSULATION
7E
FF 7D 23 7D · · · 5D 21 7D 30 23
7E
ADDITIONAL INFORMATION
OCTET INSERTION/ DELETION PROCESSING
PHYSICAL LAYER
23
7D
FF
7E
ORIGINAL DATA
DATA AFTER OCTET INSERTION
00h ⇔ 7D20h
1Fh ⇔ 7D3Fh
7D ⇔ 7D5D
7E ⇔ 7D5E
DATA TRANSFER

FIG.10

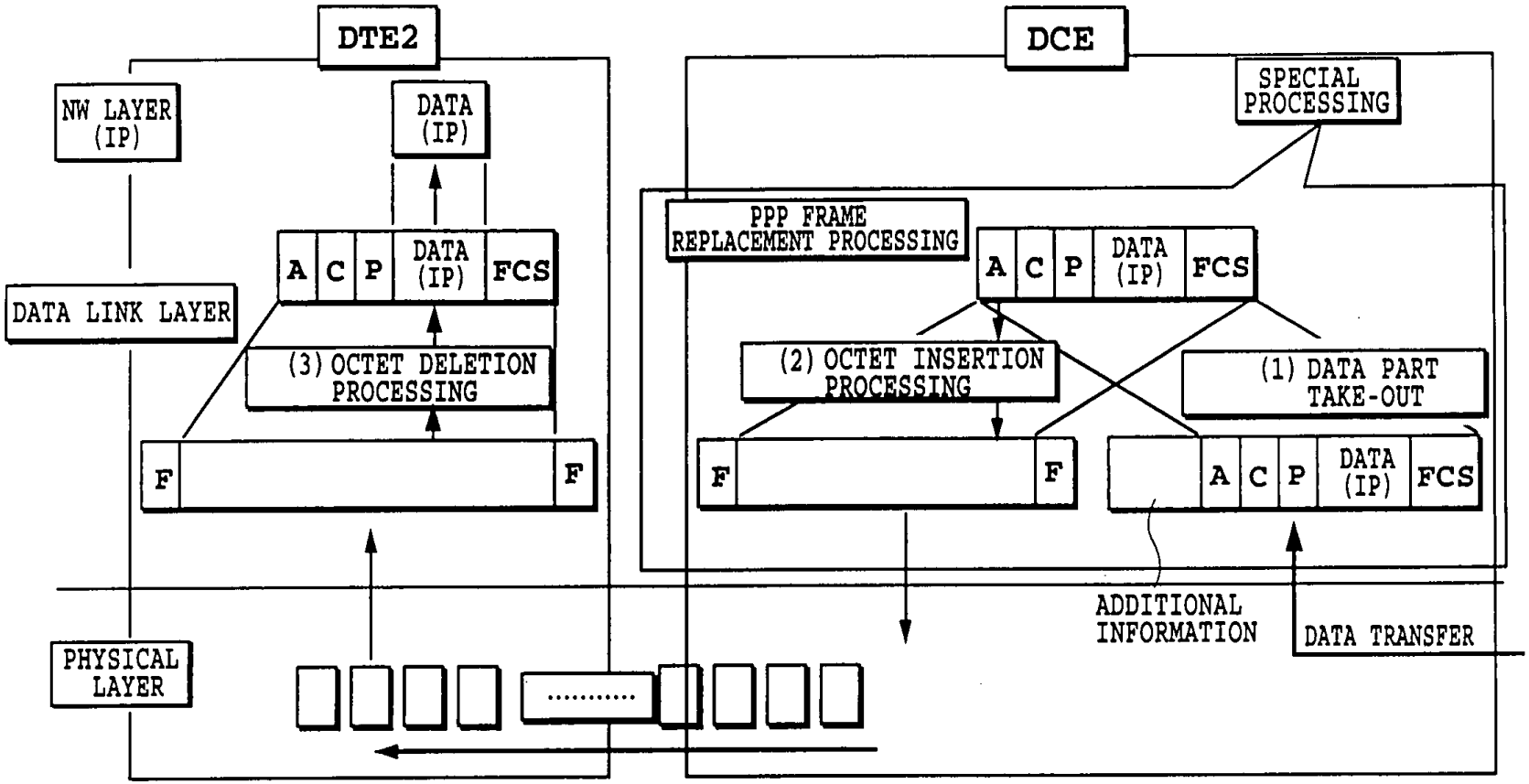
DTE2
DCE
NW LAYER (IP)
DATA (IP)
SPECIAL PROCESSING
PPP FRAME REPLACEMENT PROCESSING
A C P DATA (IP) FCS
DATA LINK LAYER
(3) OCTET DELETION PROCESSING
(2) OCTET INSERTION PROCESSING
(1) DATA PART TAKE-OUT
F F
ADDITIONAL INFORMATION
DATA TRANSFER
PHYSICAL LAYER

FIG.11

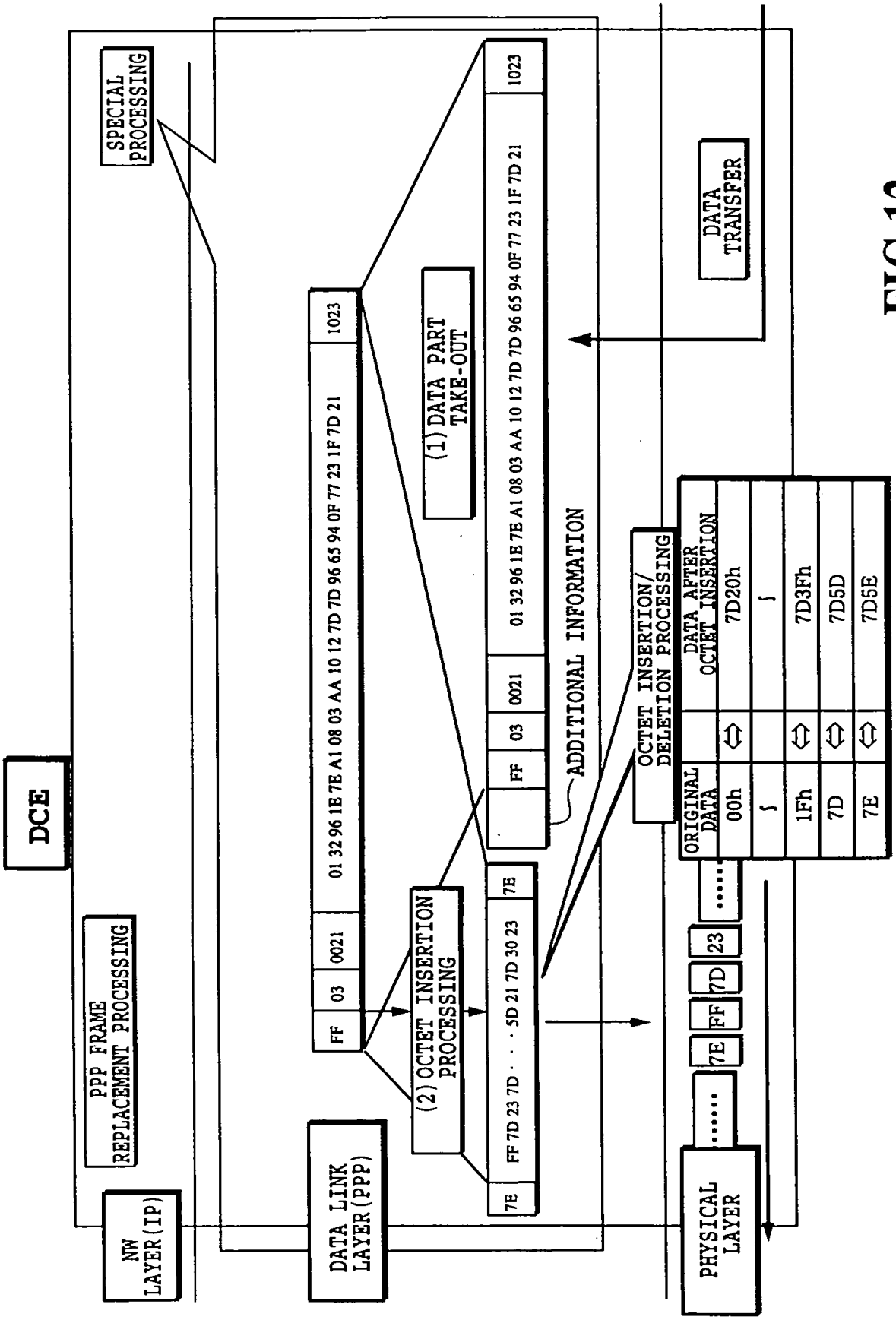
DCE
SPECIAL PROCESSING
PPP FRAME REPLACEMENT PROCESSING
NW LAYER(IP)
DATA LINK LAYER(PPP)
PHYSICAL LAYER
DATA TRANSFER
(1) DATA PART TAKE-OUT
(2) OCTET INSERTION PROCESSING
OCTET INSERTION/ DELETION PROCESSING
ADDITIONAL INFORMATION
FF 03 0021 01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21 1023
7E FF 7D 23 7D · · · 5D 21 7D 30 23 7E
FF 03 0021 01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21 1023
ORIGINAL DATA
DATA AFTER OCTET INSERTION
00h 7D20h
1Fh 7D3Fh
7D 7D5D
7E 7D5E
7E FF 7D 23
7E

FIG.12

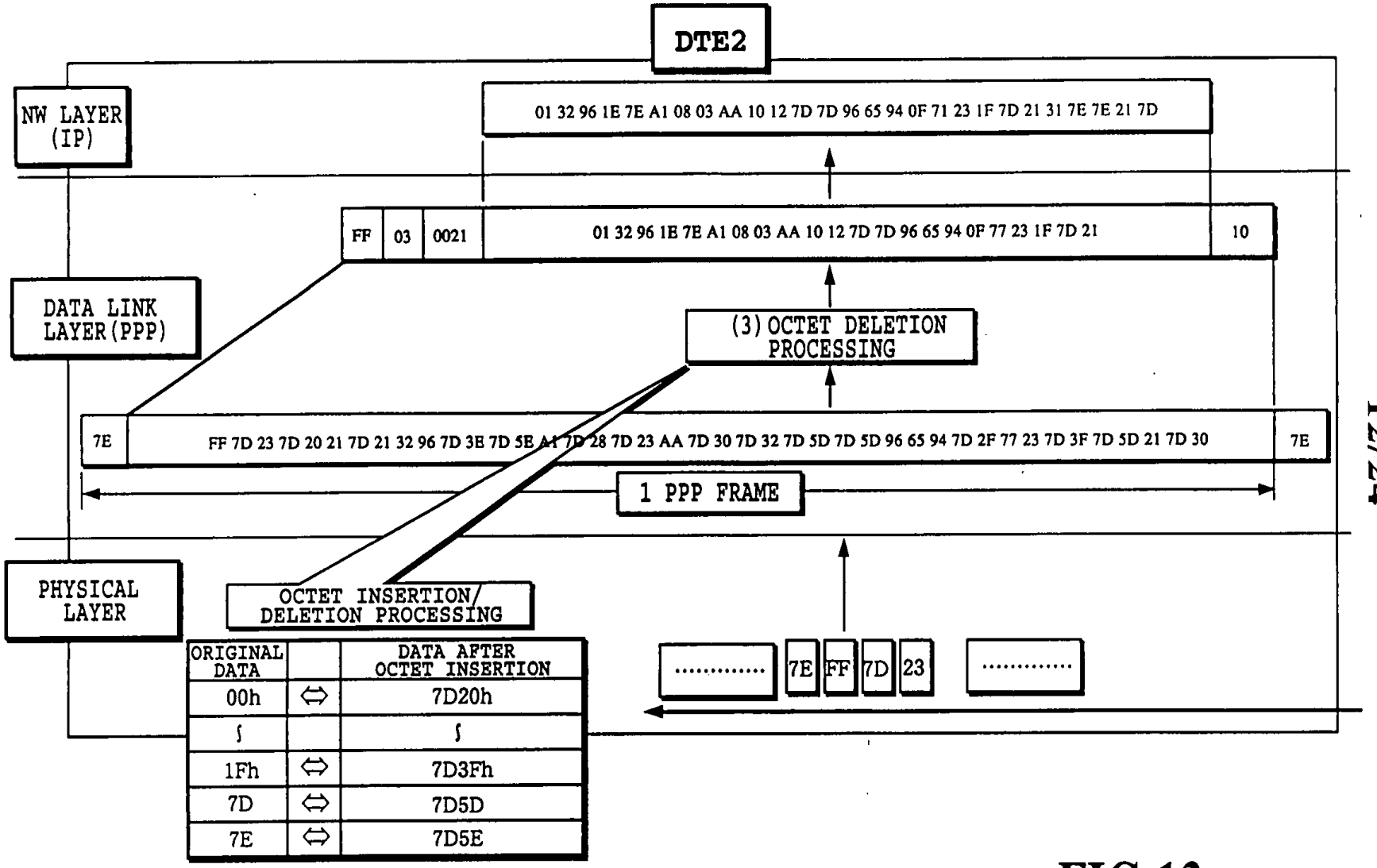
DTE2
NW LAYER (IP)
01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 71 23 1F 7D 21 31 7E 7E 21 7D
FF
03
0021
01 32 96 1E 7E A1 08 03 AA 10 12 7D 7D 96 65 94 0F 77 23 1F 7D 21
10
DATA LINK LAYER(PPP)
(3) OCTET DELETION PROCESSING
7E
FF 7D 23 7D 20 21 7D 21 32 96 7D 3E 7D 5E A1 7D 28 7D 23 AA 7D 30 7D 32 7D 5D 7D 5D 96 65 94 7D 2F 77 23 7D 3F 7D 5D 21 7D 30
7E
1 PPP FRAME
PHYSICAL LAYER
OCTET INSERTION/ DELETION PROCESSING
ORIGINAL DATA
DATA AFTER OCTET INSERTION
00h ⇔ 7D20h
∫ ∫
1Fh ⇔ 7D3Fh
7D ⇔ 7D5D
7E ⇔ 7D5E
.....
7E FF 7D 23
.....

FIG.13

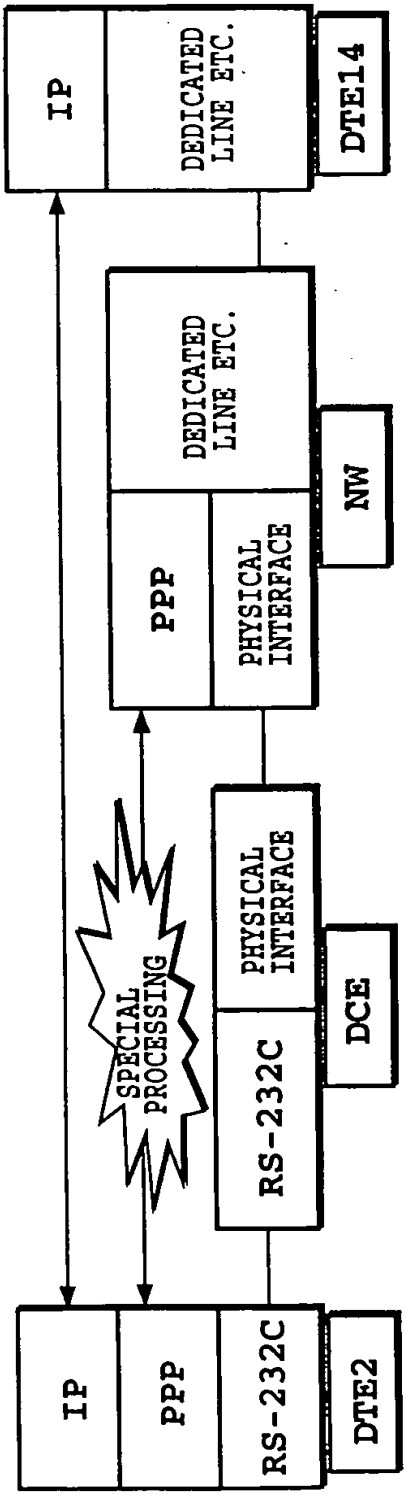
IP
DEDICATED LINE ETC.
DTE14
DEDICATED LINE ETC.
PPP
PHYSICAL INTERFACE
NW
SPECIAL PROCESSING
PHYSICAL INTERFACE
RS-232C
DCE
IP
PPP
RS-232C
DTE2

FIG.14

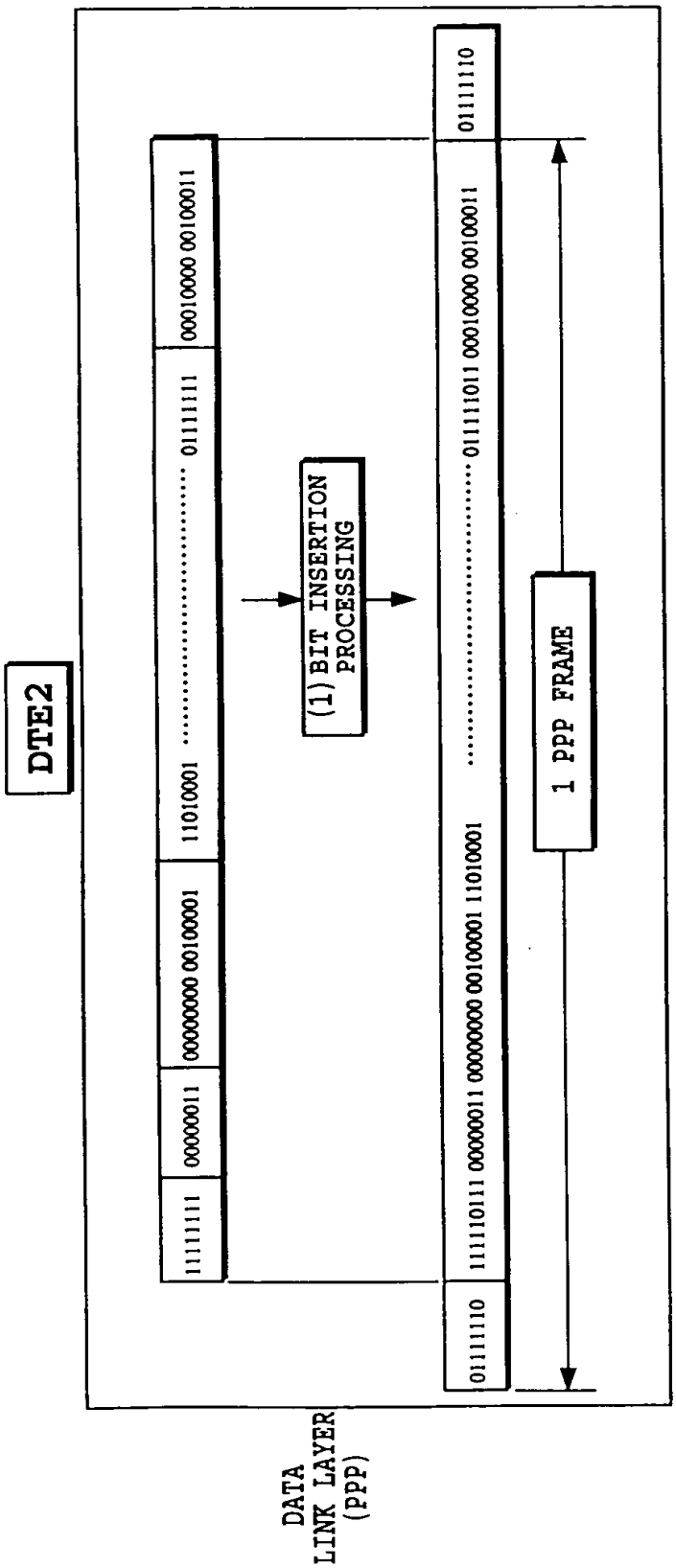
DTE2
DATA LINK LAYER (PPP)
11111111 00000011 00000000 00100001 11010001 ..... 01111111 00010000 00100011
(1) BIT INSERTION PROCESSING
01111110 11111011 00000011 00000000 00100001 11010001 ..... 01111101 00010000 00100011 01111110
1 PPP FRAME

FIG.15

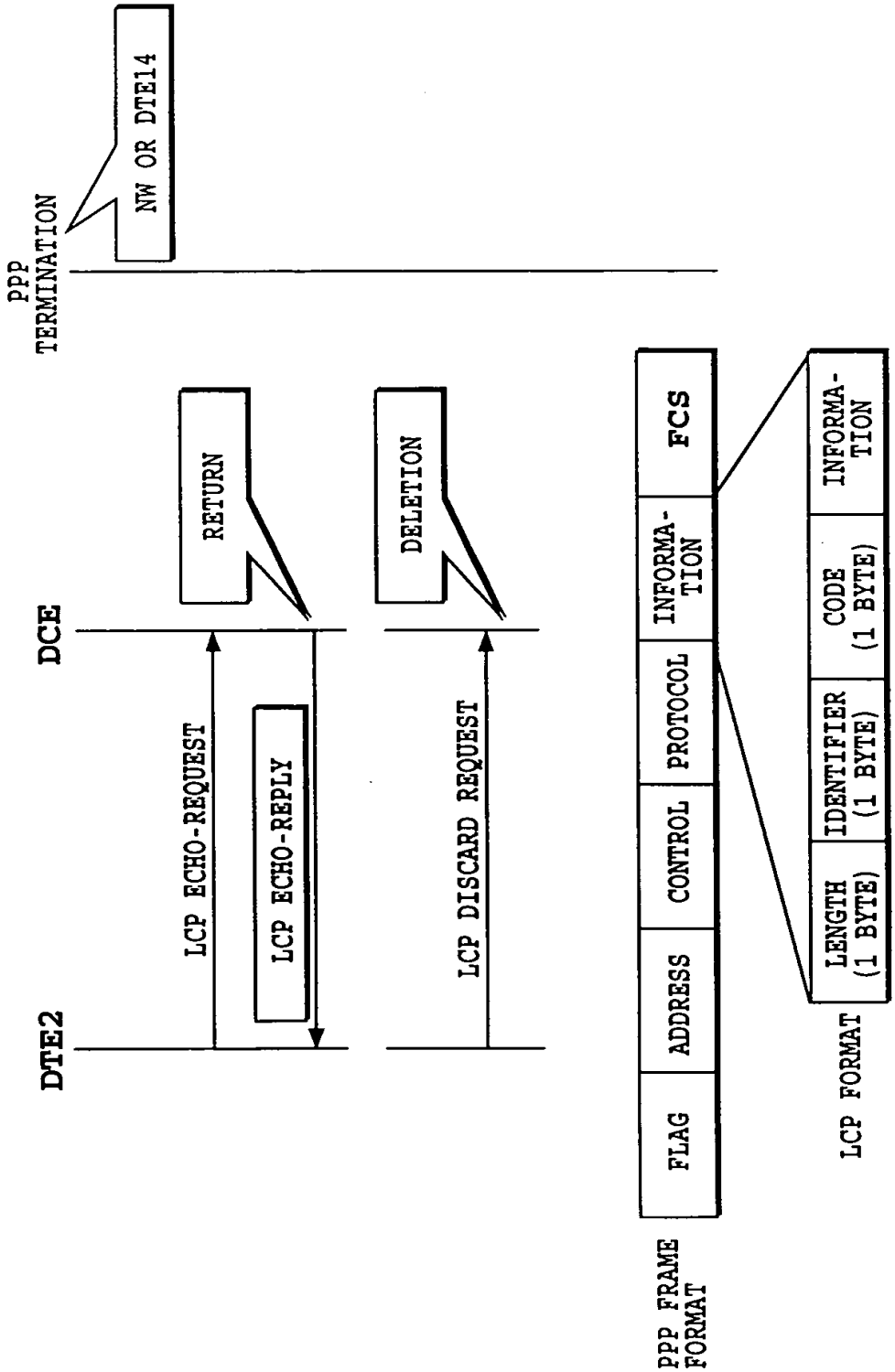
PPP TERMINATION
NW OR DTE14
DCE
RETURN
DELETION
DTE2
LCP ECHO-REQUEST
LCP ECHO-REPLY
LCP DISCARD REQUEST
PPP FRAME FORMAT
FLAG
ADDRESS
CONTROL
PROTOCOL
INFORMA-TION
FCS
LCP FORMAT
LENGTH (1 BYTE)
IDENTIFIER (1 BYTE)
CODE (1 BYTE)
INFORMA-TION

FIG.16

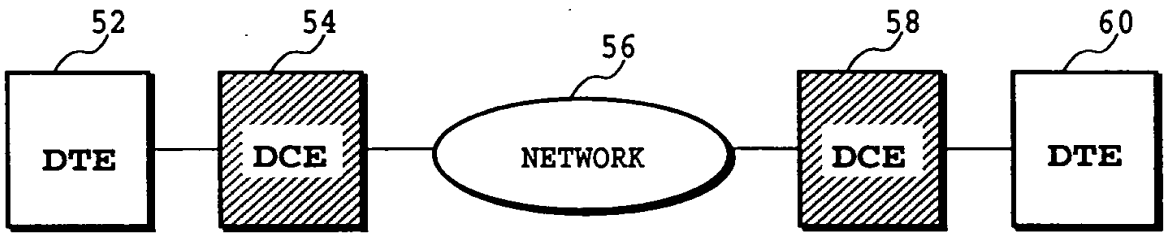

FIG.17

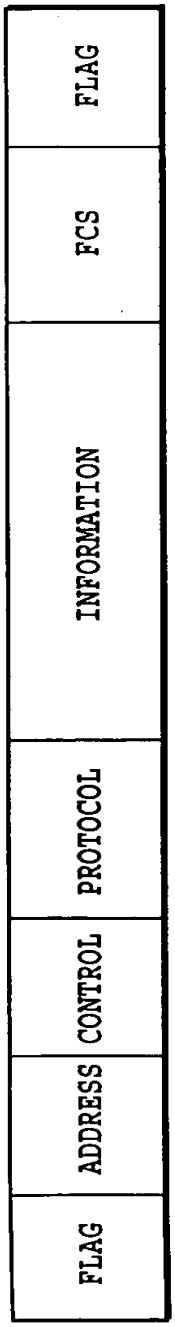

FIG.18

09/05/2004, 09:44:09

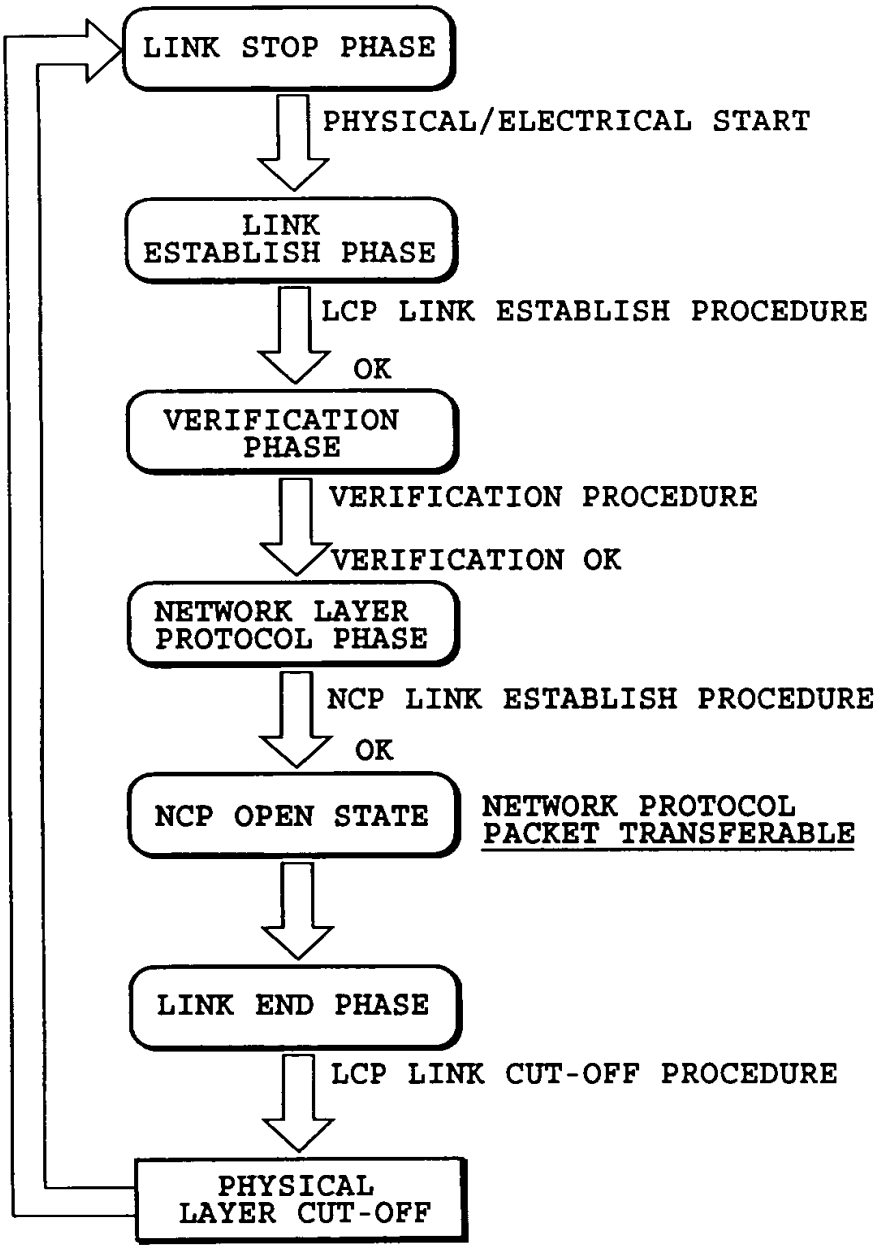
LINK STOP PHASE
PHYSICAL/ELECTRICAL START
LINK ESTABLISH PHASE
LCP LINK ESTABLISH PROCEDURE
OK
VERIFICATION PHASE
VERIFICATION PROCEDURE
VERIFICATION OK
NETWORK LAYER PROTOCOL PHASE
NCP LINK ESTABLISH PROCEDURE
OK
NCP OPEN STATE
NETWORK PROTOCOL PACKET TRANSFERABLE
LINK END PHASE
LCP LINK CUT-OFF PROCEDURE
PHYSICAL LAYER CUT-OFF

FIG.19

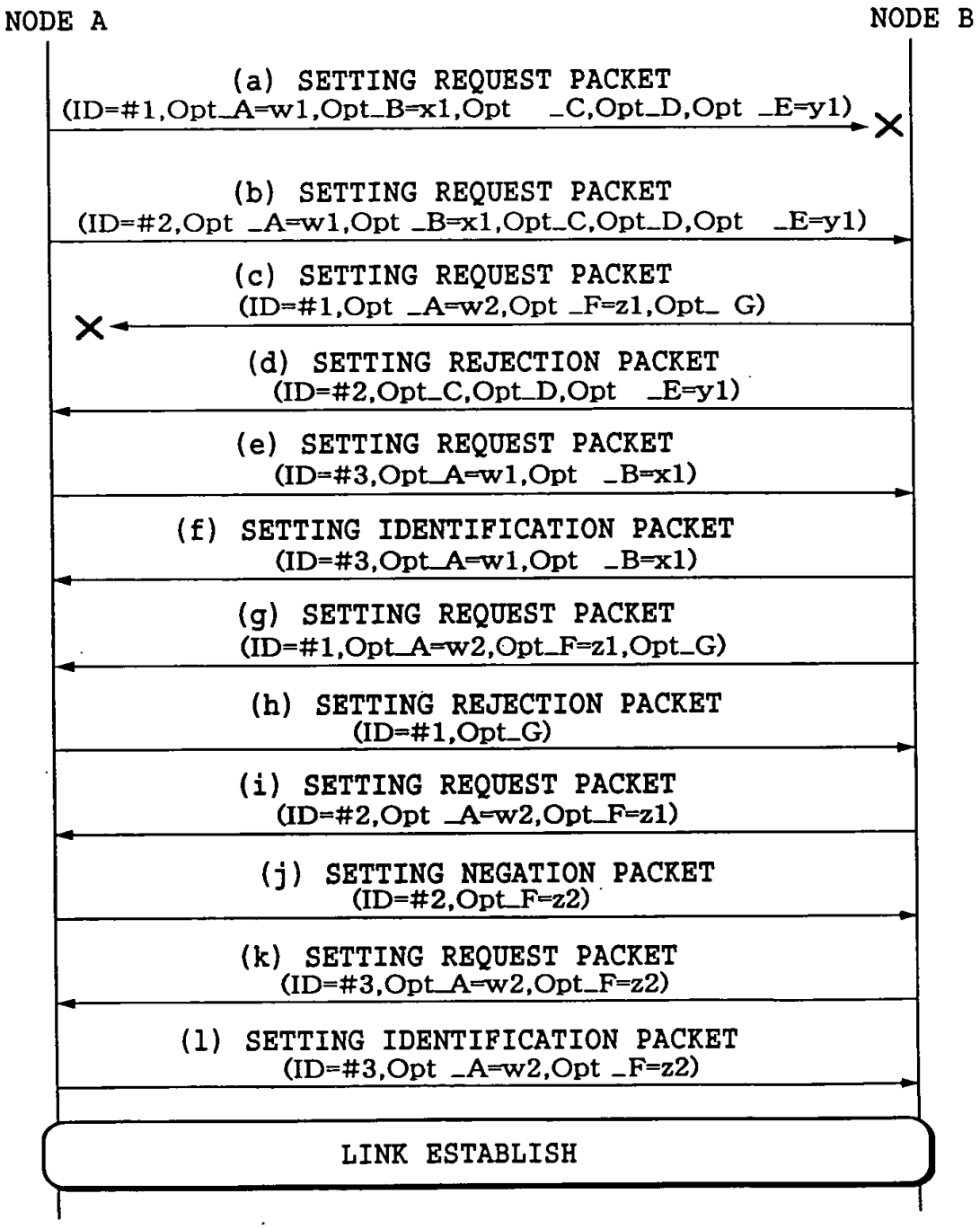
NODE A
NODE B
(a) SETTING REQUEST PACKET
(ID=#1,Opt_A=w1,Opt_B=x1,Opt _C,Opt_D,Opt _E=y1)
(b) SETTING REQUEST PACKET
(ID=#2,Opt _A=w1,Opt _B=x1,Opt_C,Opt_D,Opt _E=y1)
(c) SETTING REQUEST PACKET
(ID=#1,Opt _A=w2,Opt _F=z1,Opt_ G)
(d) SETTING REJECTION PACKET
(ID=#2,Opt_C,Opt_D,Opt _E=y1)
(e) SETTING REQUEST PACKET
(ID=#3,Opt_A=w1,Opt _B=x1)
(f) SETTING IDENTIFICATION PACKET
(ID=#3,Opt_A=w1,Opt _B=x1)
(g) SETTING REQUEST PACKET
(ID=#1,Opt_A=w2,Opt_F=z1,Opt_G)
(h) SETTING REJECTION PACKET
(ID=#1,Opt_G)
(i) SETTING REQUEST PACKET
(ID=#2,Opt _A=w2,Opt_F=z1)
(j) SETTING NEGATION PACKET
(ID=#2,Opt_F=z2)
(k) SETTING REQUEST PACKET
(ID=#3,Opt_A=w2,Opt_F=z2)
(l) SETTING IDENTIFICATION PACKET
(ID=#3,Opt _A=w2,Opt _F=z2)
LINK ESTABLISH

FIG.20

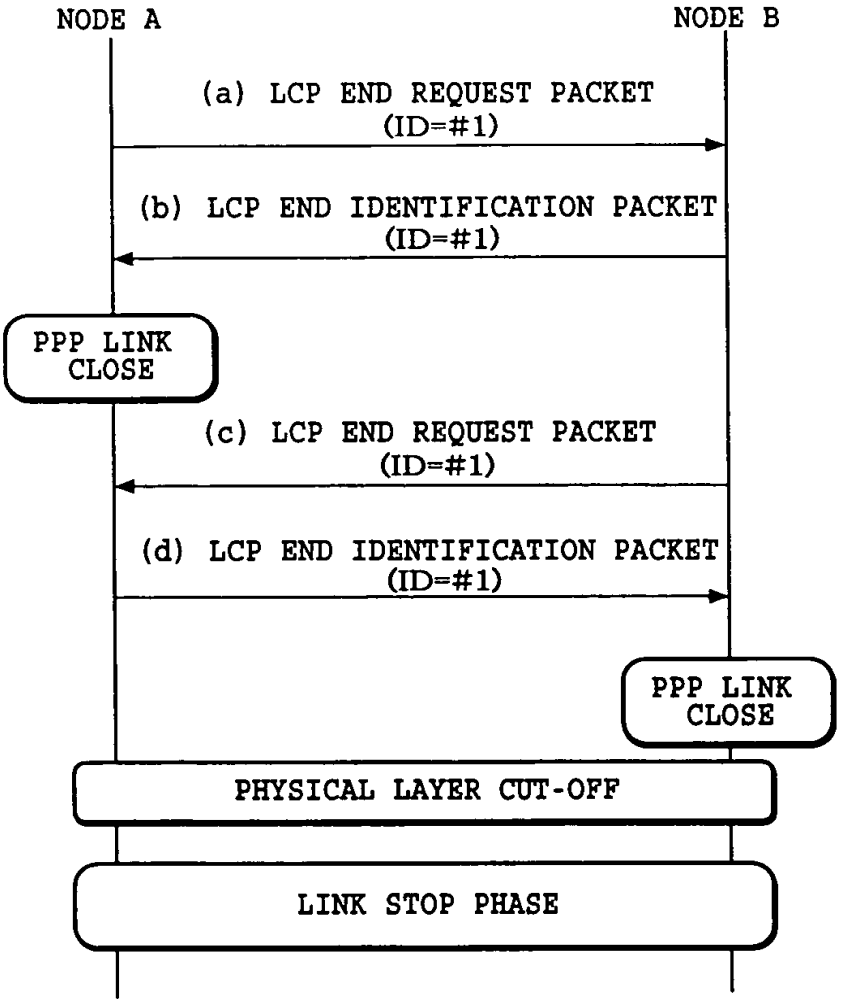
NODE A
NODE B
(a) LCP END REQUEST PACKET
(ID=#1)
(b) LCP END IDENTIFICATION PACKET
(ID=#1)
PPP LINK CLOSE
(c) LCP END REQUEST PACKET
(ID=#1)
(d) LCP END IDENTIFICATION PACKET
(ID=#1)
PPP LINK CLOSE
PHYSICAL LAYER CUT-OFF
LINK STOP PHASE

FIG.21

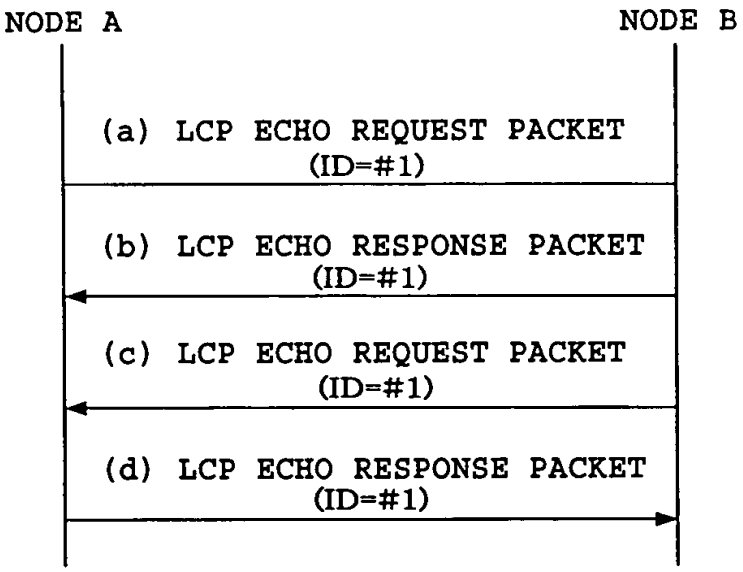
NODE A
NODE B
(a) LCP ECHO REQUEST PACKET
(ID=#1)
(b) LCP ECHO RESPONSE PACKET
(ID=#1)
(c) LCP ECHO REQUEST PACKET
(ID=#1)
(d) LCP ECHO RESPONSE PACKET
(ID=#1)

FIG.22

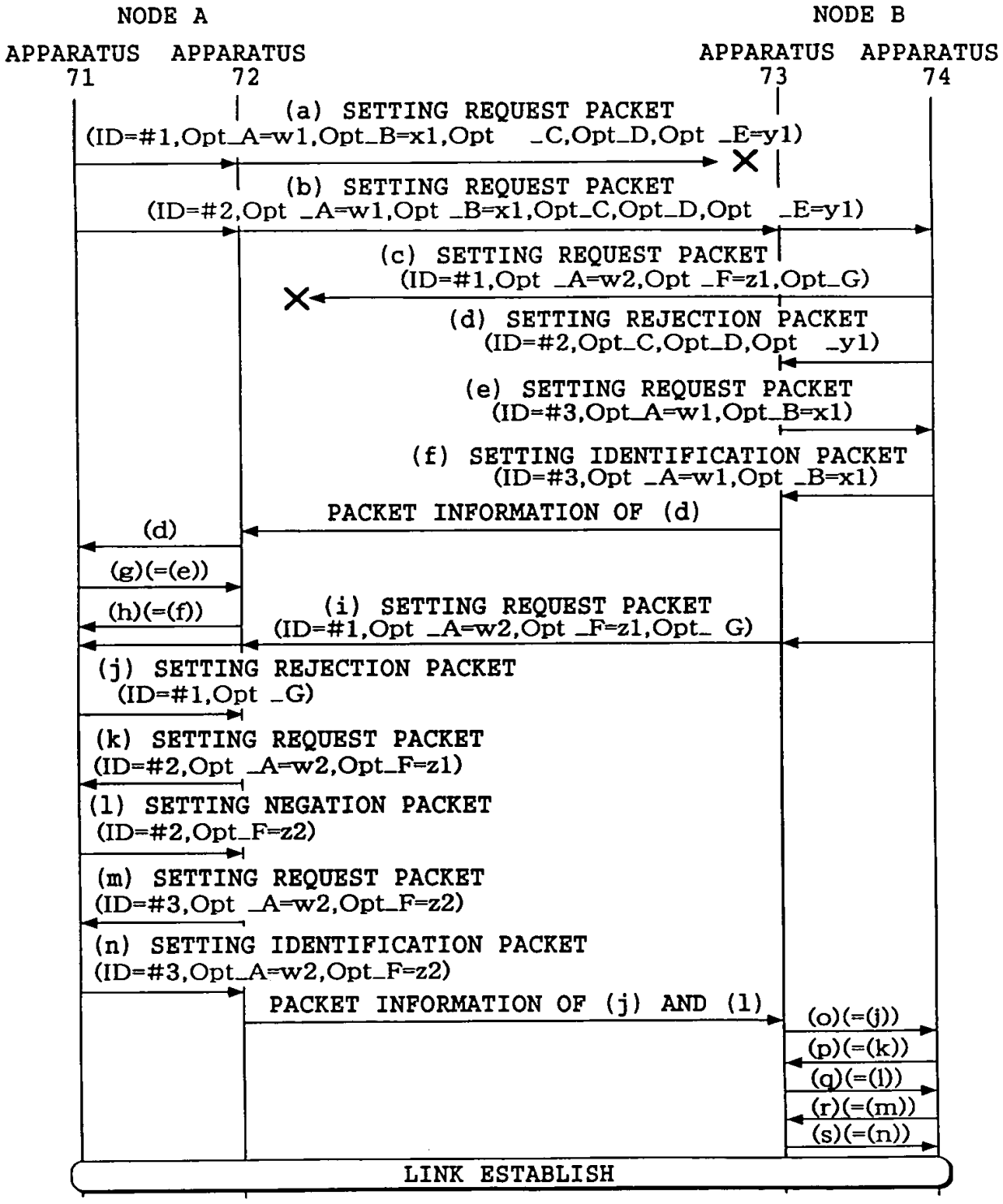
NODE A
NODE B
APPARATUS 71
APPARATUS 72
APPARATUS 73
APPARATUS 74
(a) SETTING REQUEST PACKET
(ID=#1,Opt_A=w1,Opt_B=x1,Opt _C,Opt_D,Opt _E=y1)
(b) SETTING REQUEST PACKET
(ID=#2,Opt _A=w1,Opt _B=x1,Opt_C,Opt_D,Opt _E=y1)
(c) SETTING REQUEST PACKET
(ID=#1,Opt _A=w2,Opt _F=z1,Opt_G)
(d) SETTING REJECTION PACKET
(ID=#2,Opt_C,Opt_D,Opt _y1)
(e) SETTING REQUEST PACKET
(ID=#3,Opt_A=w1,Opt_B=x1)
(f) SETTING IDENTIFICATION PACKET
(ID=#3,Opt _A=w1,Opt _B=x1)
PACKET INFORMATION OF (d)
(d)
(g)(=(e))
(h)(=(f))
(i) SETTING REQUEST PACKET
(ID=#1,Opt _A=w2,Opt _F=z1,Opt_ G)
(j) SETTING REJECTION PACKET
(ID=#1,Opt _G)
(k) SETTING REQUEST PACKET
(ID=#2,Opt _A=w2,Opt_F=z1)
(l) SETTING NEGATION PACKET
(ID=#2,Opt_F=z2)
(m) SETTING REQUEST PACKET
(ID=#3,Opt _A=w2,Opt_F=z2)
(n) SETTING IDENTIFICATION PACKET
(ID=#3,Opt_A=w2,Opt_F=z2)
PACKET INFORMATION OF (j) AND (l)
(o)(=(j))
(p)(=(k))
(q)(=(l))
(r)(=(m))
(s)(=(n))
LINK ESTABLISH

FIG.23

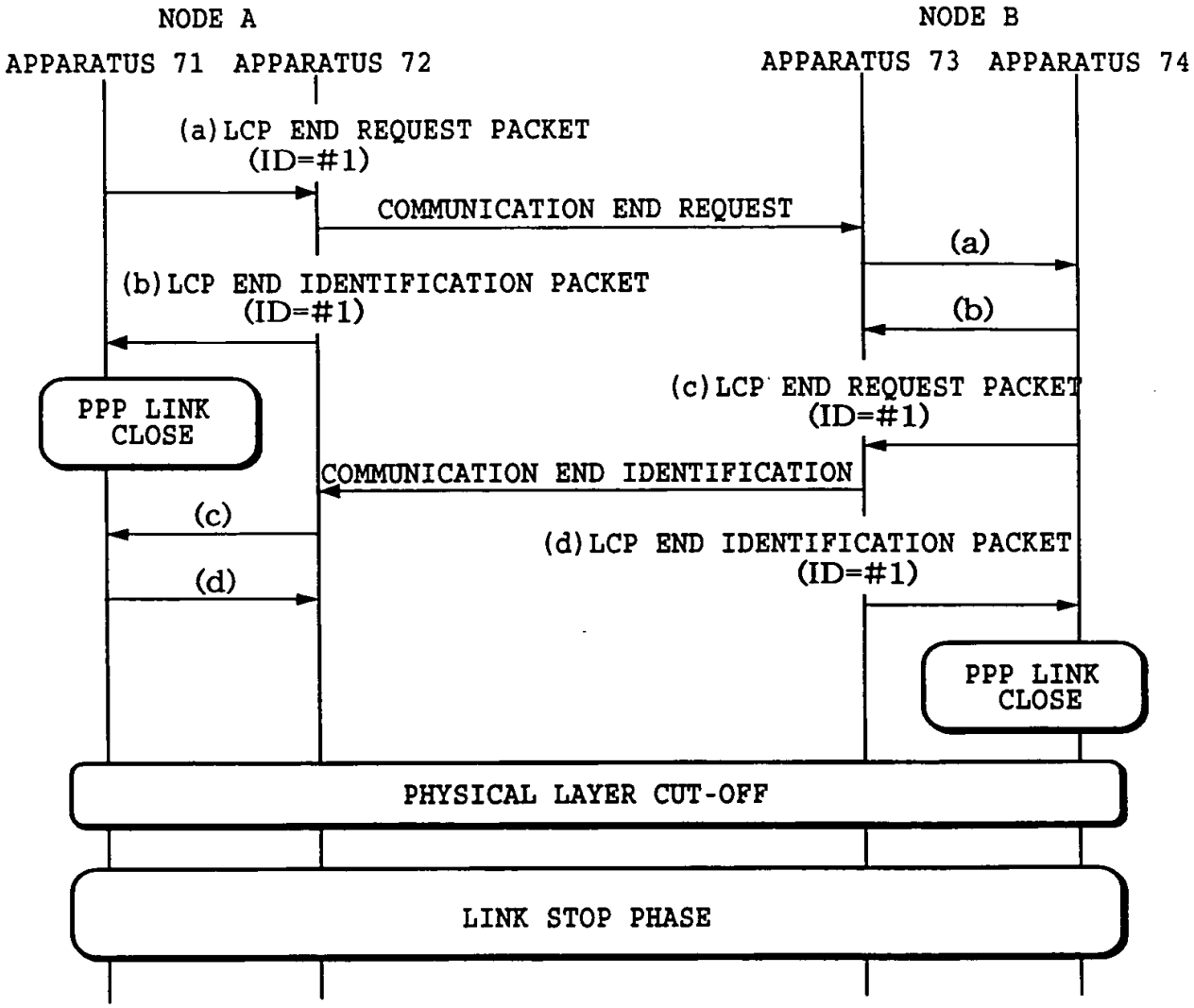
NODE A
APPARATUS 71
APPARATUS 72
NODE B
APPARATUS 73
APPARATUS 74
(a) LCP END REQUEST PACKET (ID=#1)
COMMUNICATION END REQUEST
(a)
(b) LCP END IDENTIFICATION PACKET (ID=#1)
(b)
PPP LINK CLOSE
(c) LCP END REQUEST PACKET (ID=#1)
COMMUNICATION END IDENTIFICATION
(c)
(d) LCP END IDENTIFICATION PACKET (ID=#1)
(d)
PPP LINK CLOSE
PHYSICAL LAYER CUT-OFF
LINK STOP PHASE

FIG.24

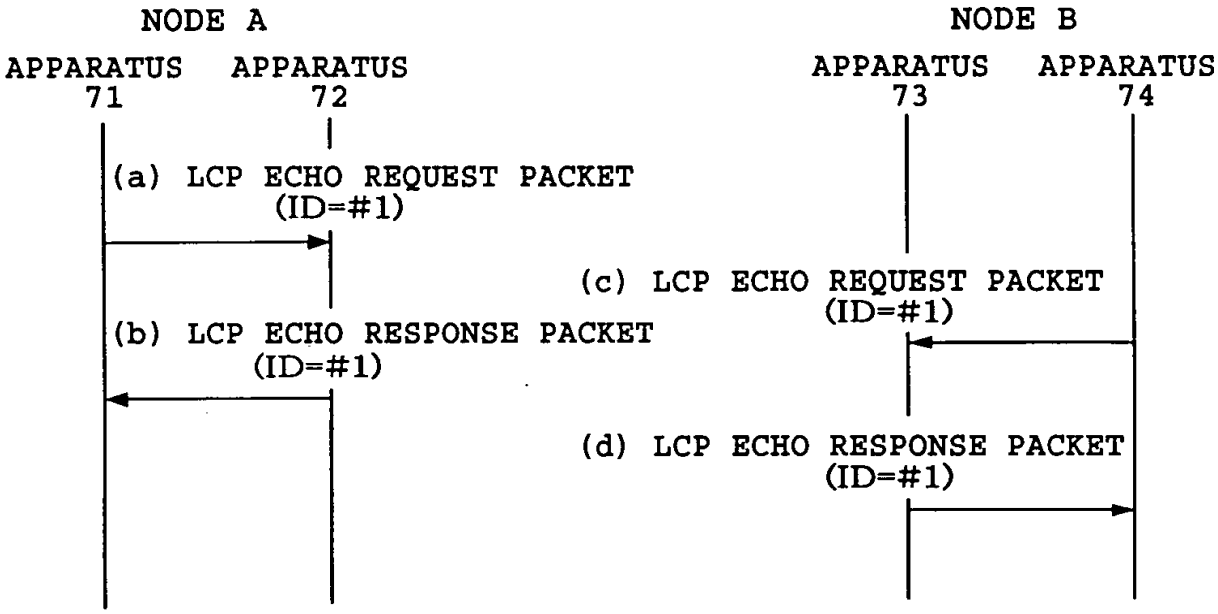
NODE A
NODE B
APPARATUS 71
APPARATUS 72
APPARATUS 73
APPARATUS 74
(a) LCP ECHO REQUEST PACKET (ID=#1)
(b) LCP ECHO RESPONSE PACKET (ID=#1)
(c) LCP ECHO REQUEST PACKET (ID=#1)
(d) LCP ECHO RESPONSE PACKET (ID=#1)

FIG.25